TACSM Abstract

Metabolic Efficiency During Ramp Test in Collegiate Cyclists

Ross H, Onwubuya K, and Wyatt F

Human Performance Laboratory; Department of Athletic Training and Exercise Physiology; Midwestern State University; Wichita Falls, TX

Category: Masters

Advisor / Mentor: Wyatt, Frank (frank.wyatt@mwsu.edu)

ABSTRACT

PURPOSE: The aim of this study was to determine trend-line patterns for efficiency in collegiate, competitive cyclists. METHODS: Subjects included 17male and 6 female (n=23) . Measures were the following: age (y), height (cm), weight (kg), maximal oxygen consumption (VO_2max, $mL*kg^{-1}*min.^{-1}$), maximal heart rate (MHR, $b*min.^{-1}$), blood lactate (BLa, mM) and maximal power (w). Subjects were fit, collegiate cyclists competing for Midwestern State University cycling team. Each subject performed a cycle ergometer test utilizing the Australian Institute of Sport (AIS) cycle ergometer protocol. Blood lactate was determined by removing 10µl each minute during the cycle ergometer test to volitional fatigue. Oxygen consumption (VO_2, $mL*kg^{-1}*min.^{-1}$) per power output (watts) was calculated as metabolic efficiency ($VO_2*watts^{-1}$). Trend-line analysis was correlated with metabolic efficiency in response to VO_2 per work at each stage . Statistical significance was set a priori at $p \leq 0.05$. Results: Mean (SD) demographic measures were the following: age (y) 22.8 (3.8); height (cm) 169.4 (16.9); weight (kg) 74.6 (5.20); Metabolic efficiency ($VO_2*watts^{-1}$) indicated a power curvilinear trend-line. Male data averaged across power output resulted in a mathematical power trend-line with a coefficient of determination of R^2=.898. Female data averaged across power resulted in a power trend-line with a coefficient of determination of R^2=.943. Conclusion: During the cycle ergometer test, cyclists exhibited an enhanced metabolic efficiency as work increased. However, trend-line analysis indicated a plateau as the subjects neared volitional fatigue.